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EXAMINER	
CHANG, AUDREY Y	

ART UNIT	PAPER NUMBER
2872	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/724,551	RANALLI, ELISEO R.	
	Examiner	Art Unit	
	Audrey Y. Chang	2872	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 September 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *11-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *11-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Remark

- This Office Action is in response to applicant's amendment filed on September 29, 2008, which has been entered into the file.
- By this amendment, the applicant has amended claims 11-14 and 17 and has canceled claim 18.
- Claims 11-17 remain pending in this application.

Response to Amendment

1. The amendment filed on **October 31, 2007 and September 29, 2008 are** objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: claims **11-13 have been amended** to include the phrase "reflective facets selective disposed in a non-constant period arrangement", and **claims 11-13 have been amended** to include the phrase "unequal in spacing and width dimension". **Claim 12 has been amended** to include the phrase "optical outputs of the single-mode entrance and exit apertures being collimated".

The specification FAILS to disclose explicitly that the reflective facet portions are disposed at a non-constant period arrangement. The specification fails to give explicit teachings about the spacing and width dimensions being unequal for the facet portions. In fact the specification fails to identify what is considered to be the "spacing" and what is considered to be the "width dimension" of the facet portions.

The specification fails to disclose that the output from the entrance aperture and exit aperture being collimated, (please see Figure 6 of the specification).

The applicant is respectfully noted the specification fails to give positive and explicit disclosure for such features. The paragraphs [0034] and [0036] identified by the applicant in the "remark" fail to give positive support for the new-matter features claimed above.

Applicant is required to cancel the new matter in the reply to this Office Action.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. **Claims 11-17 are rejected under 35 U.S.C. 112, first paragraph**, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The reasons for rejection based on the newly added matters are set forth in the section "response to amendment" above.

4. **Claims 11-17 are rejected under 35 U.S.C. 112, first paragraph**, as failing to comply with the **enablement requirement**. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The specification and the claims fail to teach how could the reflective facet portions is capable of being disposed in "a non-constant period arrangement". In particular, the specification fails to disclose what is considered to be the period with respect the plurality of facet portions. This means "non-constant period arrangement" really cannot be defined.

The specification and the claims also fail to teach how the "entrance and exit apertures" could be operable to "spatially single mode filter an optical field An aperture is just an opening. It is not clear how these "openings" could be "spatially single mode filter an optical field". It is not clear single mode of what is being achieved here?

In response to applicant's arguments there is no optical fiber ever being claimed with the feature concerning "single mode" and "spatially single mode filter on optical field". The claim with the features is still not enabling.

Claim Objections

5. Claims 11-17 are objected to because of the following informalities:

(1). The phrase "a non-constant period arrangement" recited in claims 11-13 is confusing since it is not clear what is considered to be the period. Does this mean the dimension of each facet is considered to be a period or not? (*Claims needs to be amended to clarify the confusion).*

(2). The phrase "respective frequency in Hz" recited in claims 11-13 is confusing since it is not clear the frequency is referred to frequency of what?

(3). The "amplitude A (v)" and the "phase "Θ (v)" recited in claims 11-13 are confusing since it is not clear the amplitude and phase are the measures of what? (*Claims needs to be amended to clarify the confusion. The applicant is respectfully noted that there are no explicit disclosure of* "amplitude A (v)" and the "phase "Θ (v)", *consequent amendment may result new matters rejection).*

(4). The phrase "respective facets of at least a pair of contiguous reflective facets being unequally in spacing and width dimension" is confusing since it is not clear what is considered to be the "spacing" and the "width dimension" here? It is not clear of the spacing is referred to the space between two adjacent facet portions or the dimension of the facet portion itself? (*The applicant is respectfully noted that the specification and the claims still fail to identify what is considered to be "width" and what is considered to be "spacing"? Claims need to be amended to clarify the confusions.*

(5). It is not clear how the apertures capable of filtering an optical field could? *The applicant is respectfully noted that the claims fail to identify the apertures are optical fiber.*

(6). The phrase "sampling interval T seconds" recited in claim 13 is confusing and indefinite since it is not clear the sampling is about what? What is being sampled here? . The phrase "selecting

sampling interval T seconds … over which a predetermined narrow-band temporal optical transfer function H (v) is uniquely specified" recited in claim 13 is confusing and indefinite since this phrase seems to be going a circle. It is known that without the H (v) function being **specified** the sampling interval can be selected **arbitrarily** and any function once being specified is uniquely specified. This phrase therefore is not making any sense as far as the limitations concerns.

(7). The steps (c) and (d) recited in claim 13 are not definite since the following symbols "H(v), h_m, "vc", and "m" have not been defied or given physical meanings. The equation recited therein therefore has no meanings.

(8). It is not clear what is considered to be the characteristic curve for H(v) as recited in claim 13. What is considered to be the "impulse response"? What is the "delay"?

(9). Claim 13 includes numerous mathematical functions, symbols and terminology, that are without any physical means associated with it. The applicant is respectfully reminded that mathematical symbols and functions are **ABSTRACT** objects, until they are associated with physical meanings, they yield no meanings to the fabrication of the echelle structure.

(10). The phrase "coated for increased reflectivity" recited in claim 15 is unclear since it is not clear it is being coated with what?

The applicant is respectfully noted that claim 13 is really drawn to mathematical equations with abstract variables. Without specifying the abstract variables with physical meaning and definitions, the mathematical equation is nothing but an abstract object that does not define any definite metes and bounds. Furthermore, since there are no any specific forms of the equations and symbols, it appears any echelle structure can be defined by such methods or any echelle structure implicitly is fabricated by the method.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Hetrick (PN. 4,991,934) in view of the patent issued to Hetrick (PN. 4,798,446).

Hetrick ('934) teaches a **varied space** *diffraction grating* (12, Figures 1-2) for a monochromator (Figure 1) that serves as the *echelle* structure wherein the diffraction grating has a grating surface with a plurality of *contiguous* grooves (please see Figure 2) that reflects the incident light, wherein the groove space is varied so that the grooves are disposed in a *non-constant period arrangement.* It is implicitly true that at lest one pair of the adjacent grooves of the diffraction grating is unequally in space and width dimension.

It is implicitly true that the echelle type diffraction grating has an ***inherent*** optical transfer function, (which describes the optical action of the diffraction grating acts upon the incident light), and it is implicitly true that the optical transfer function is a *complex* function of frequency with amplitude and phase. One skilled in the art would know that Hz, or hertz, is the standard unit for frequency.

This reference has met all the limitations of the claims. Hetrick ('934) teaches that the diffraction grating is comprised of a plurality of reflecting contiguous grooves, (please see Figure 2). It however does not teach explicitly that the reflecting grooves are formed by plurality of reflective facets. Hetrick ('446) in the same field of endeavor teaches a reflecting diffraction grating having a plurality of reflecting contiguous grooves whose spacing are varied progressively, (please see Figure 2, column 2, lines 38-40). Hetrick ('446) further teaches that the plurality of reflecting contiguous grooves is formed by a plurality

of reflecting facets, (18, Figure 2). It would then have been obvious to one skilled in the art to apply the teachings of Hetrick ('446) to modify the echelle structure of the diffraction grating of Hetrick ('934) to use plurality of reflecting facet to form the reflecting grooves for the benefit of using a known design to facilitate the echelle structure or the diffraction grating.

8. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Hetrick (PN. 5,274,435) in view of the patent issued to Hetrick (PN. 4,789,446) and Sappey (PN. 6,647,182).

Hetrick teaches a *monochromator* and/or *spectrometer*, (please see Figures 3 and 12) serves as the optical device, that is comprised of *an entrance slit* (28) and *exit slit* (**48**) serve as *entrance aperture and exit aperture respectively*, and a *reflection type diffraction grating* (22) serves as the *echelle* structure that is disposed between the entrance and exit apertures. The diffraction grating has a grating surface (24) with a plurality of *contiguous* grating grooves (40) that reflect the incident light, and the groove space is *varied* so that the grooves are disposed in a *non-constant period arrangement*. It is implicitly true that at lest one pair of the adjacent grooves of the diffraction grating is unequally in space and width dimension, (please see column 5, lines 3-6 and column 11, lines 54-56). The monochromator and/or spectrometer further has collimating means (such as collimating mirror 38, please see column **4**, line 38) for collimating the input beam so that components of the light beam incident on each reflection grooves is at the same angle. The diffraction grating and the optical system utilizing it implicitly realize an arbitrary transfer function.

This reference has met all the limitations of the claims. Hetrick ('934) teaches that the diffraction grating is comprised of a plurality of reflecting contiguous grooves, (please see Figure 2). It however does not teach explicitly that the reflecting grooves are formed by plurality of reflective facets. **Hetrick** ('446) in the same field of endeavor teaches a reflecting diffraction grating having a plurality of reflecting

contiguous grooves whose spacing are varied progressively, (please see Figure 2, column 2, lines 38-40). Hetrick ('446) further teaches that the plurality of reflecting contiguous grooves is formed by a plurality of reflecting facets (18, Figure 2). It would then have been obvious to one skilled in the art to apply the teachings of Hetrick ('446) to modify the echelle structure of the diffraction grating of Hetrick ('934) to use plurality of reflecting facet portions to form the reflecting grooves for the benefit of using a known design to facilitate the echelle structure or the diffraction grating.

Claim 12 has been amended that "optical outputs of the single mode entrance and exit apertures being collimated". These features however are not supported by the specification and are rejected under 35 USC 112, first paragraph. Hetrick ("435) teaches that the reflection type reflection grating is disposed between an entrance aperture (28) and exit aperture (48) but it does not teach explicitly that the apertures enable single-mode filtering of the input optical field. It also does not teach explicitly that the outputs of entrance and exit apertures are collimated. **Sappey** et al in the same field of endeavor teaches essentially an optical system that is based on the dispersion property of an *echelle diffraction grating* (22, Figure 1) wherein a waveguide with single mode optical fibers (14 and 16) are used as the *input and output ports* for providing input light and for receiving output light. Sappey et al further teaches that a collimating lens (18) is used to collimate the output light from the entrance aperture to so that the light components incident on each facet of the reflective echelle grating at same angle and direct to the exit aperture at the same angle. The output beam from the echelle diffractive grating is collimated the same way as the instant application. It would then have been obvious to one skilled in the art to apply the teachings of Sappey et al to modify the arrangement of Hetrick if collimated input and output beam are desired.

9. Claims 13-14 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Hetrick (PN. 4,798,446) in view of Sappey et al (PN. 6,647,182).

Hetrick teaches a reflection grating (11, Figure 1 and 2) that serves as echelle structure wherein the diffraction grating is comprised of a grating surface including a plurality of reflective facets (18) with

variable groove spacing such that the facet portions are disposed in a non-constant period arrangement. It is implicitly true that at least a pair of the reflective facets being unequal in spacing and width dimensions. Hetrick teaches that the reflection grating or echelle structure can be disposed in an optical system comprises aperture (33, Figure 3). But it does not explicitly identify an entrance aperture although the object (27) essentially serves as the entrance aperture. **Sappey** et al in the same field of endeavor teaches essentially an optical system that is based on the dispersion property of an *echelle diffraction grating* (22, Figure 1) is disposed between entrance aperture and exit aperture of single mode optical fiber, (please se Figure 1). It would then have been obvious to one skilled in the art to apply the teachings of Sappey et al to make the reflection diffraction grating or echelle structure applicable in an optical system with entrance and exit apertures.

It is implicitly true that the reflection type diffraction grating or echelle structure has an *inherent* optical transfer function, (which describes the optical action of the diffraction grating acts upon the incident light), and it is implicitly true that the optical transfer function is a *complex* function of frequency with amplitude and phase. One skilled in the art would know that Hz, or hertz, is the standard unit for frequency. It is also implicitly true that one can find a sampling interval T seconds such that the optical transfer function is *uniquely* defined. The input light beam has to illuminate on a number M of the echelle facets and it is implicitly true that the number of the facets being illuminated must be greater than the inverse of the multiple of the minimum resolvable spectral feature W (or resolution) and the time interval T, since the dimension of the number of the facets being illuminated really is comparable to the wavelength separation between consecutive waves. And since it is known in the art that the optical transfer function for the echelle diffraction grating is a measure of how the input beam being acted upon by the grating, the reflected intensity or the amplitude of the input beam by each facet therefore has to be related to the optical transfer function, and it is implicitly true that reflected intensities of the input beam

by all of the facets really defines the optical transfer function. It is therefore within the general skill of a worker in the art to find the optical transfer function H(v) that satisfies the equation stated in the claim.

This reference however does not teach *explicitly* that each of the facets is determined in the iteration steps stated in the claims. But as indicated in the paragraph above, since the mathematical relationship between the intensity of the reflected input beam by each facet and the optical transfer function does inherently present, such steps of determination is either implicitly met or obvious modification to one skilled in the art, since after all Herrick does teach a echellette diffraction grating with a plurality of reflective facets. Certain method steps for determining the reflective facets have to be implicitly included.

With claims 17 and 18, Sappey et al in the same field of endeavor teaches a wavelength divisional multiplexing system that is based on the dispersion property of an echelle diffraction grating wherein a waveguide with single mode optical fibers (14 and 16) are used as the input and output ports for providing input light and for receiving output light. It would then have been obvious to one skilled in the art to use the waveguide structure as an alternative means for the light entrances and exit apertures for the benefit of more efficiently transporting the light beam.

10. Claims 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patents issued to Hetrick ('934) and Hetrick ('446) as applied to claim 11 above, and further in view of the patent issued to Sappy et al (PN. 6,647,182).

The echelle structure or reflection type diffraction grating taught by **Hetrick ('934) in combination with the teachings of Hetrick ('446)** as described for claim 11 above have met all the limitations of the claims. These references do not teach explicitly that the diffraction grating is formed by a master and the facets are coated to increase the reflectivity. **Sappey** et al in the same field of endeavor teaches that a typical way of forming echellette diffraction grating is by using master to mold

the grating profile and to coat the facets with *highly* reflective material, (please see column 10, lines 34-39). It would then have been obvious to one skilled in the art to apply the teachings of Sappey et al to make the reflective echellette type diffraction grating of Hetrick ('934 and '446) for the benefit of making the grating with master production method and to increase the reflectivity therefore efficiency of the grating by using highly reflective coating.

Response to Arguments

11. Applicant's arguments filed on September 29, 2008 have been fully considered but they are not persuasive.

12. In response to applicant's arguments which state that the cited Hetrick does not describe how one can arbitrarily modify the groove structure to achieve an arbitrary transfer function which therefore differs from the instant application, the examiner respectfully disagrees for the reasons stated below. The claims fail to claim "arbitrarily modify the groove structure" and fail to claim to achieve arbitrary transfer function. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Furthermore, the applicant fails to disclose what is considered to be the "arbitrary modifying the groove structure". Since the transfer function of any echelle diffraction grating depends on the groove structure of the specific grating, it is save to say that transfer function is a function of the groove structure. So by varying the groove structure of the grating, a new corresponding transfer function (whether be arbitrary or not) is achieved. So the claims so far only claim the well known relationship between the groove structure and the transfer function, and it is known in the art. Also if the claims are referred to an "arbitrary" transfer function, then is it not true that Airy function is one of the "arbitrary" transfer functions, since arbitrary transfer function must include an Airy function.

Conclusion

13. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Audrey Y. Chang whose telephone number is 571-272-2309. The examiner can normally be reached on Monday-Friday (9:00-4:30), alternative Mondays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephone B. Allen can be reached on 571-272-2434. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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